

as "Starch and Isomers" in the list of contents, and as "Starch and its Isomerides" above the text of the section itself. Finally, the book is described as "printed in America." Printers in the United States do not apparently believe that "the whole is greater than its part."
T. A. H.

TROPICAL CLIMATOLOGY.

Handbuch der Klimatologie. By Prof. Julius Hann. Band ii., Klimatographie. 1 Teil, Klima der Tropenzone. Dritte, wesentlich umgearbeitete und vermehrte Auflage. Pp. xii+426. (Stuttgart: J. Engelhorn, 1910.) Price 14 marks.

THIS is the first part of vol. ii. of the third edition of Prof. Hann's "Handbuch der Klimatologie." Vol. i. dealt with general principles, and we now come to the detailed consideration of the climates of different parts of the world. The volume before us concerns itself with the tropics, the consideration of temperate and polar regions being reserved for subsequent volumes. The author has not confined himself strictly to the area lying between $23\frac{1}{2}^{\circ}$ north and south of the Equator. When desirable he has gone outside this region. Roughly speaking, he discusses that portion of the earth's surface which has an annual mean temperature of 20° C. or above. The isotherm of this value may be taken as marking the polar limits of the trade winds, when definable, and of the palm tree.

A great part of the book is taken up with tables, interspersed with descriptive paragraphs taken from the writings of travellers or residents in the regions under review. The tables refer for the most part to the elements, temperature, and rainfall, but where the data are available, tables of wind direction frequency, humidity, cloud amount, and pressure are added. The additional matter incorporated since the second edition appeared in 1897 is considerable. For some areas the author has had the advantage of consulting works such as Captain Lyons's "Physiography of the Nile Basin," but for others he has had to go into the byways of meteorological literature. The labour involved in collecting and working up the scattered fragments must have been prodigious even for so indefatigable a worker as Prof. Hann, and we can but admire and marvel at the thoroughness with which the task has been completed. Much time has been expended over the calculation of true means of temperature from daily extremes or from readings at fixed hours. Even so, Prof. Hann regards many of the values as still uncertain, but in the absence of adequate knowledge of the course of the diurnal variation, no more can be done at present.

The introductory chapter discusses the general characteristics of tropical climate. A special section is devoted to its physiological action on the human organism, particularly that of the white man, and affords an opportunity of referring to the recent advances in the domain of tropical medicine. After that we are introduced successively to West Africa and the Congo, East Africa with the Sudan, the monsoonal area of Asia and northern Australia, the Pacific islands, and finally to tropical America.

OUR BOOK SHELF.

The Fourth Dimension Simply Explained. Edited by Prof. H. P. Manning. Pp. 251. (New York: Munn and Co., Ltd., 1910.) Price 1.50 dollars net.

THERE are few fallacies which have done more to mislead the unscientific public than the misconception known as *the fourth dimension*. The use of this term is calculated to convey the false impressions, first, that hypergeometry is limited to space of four dimensions instead of being extended to space of n dimensions where n is any positive integer; second, that even not going beyond four dimensions, there is one particular coordinate called the fourth dimension which stands out from the rest, and alone is worth considering.

Now so long as we regard four-dimensional space as a geometrical conception, there is no difference between its fourth dimension and its first, second, and third dimensions, just as in ordinary solid geometry there is no third dimension distinguishable in any respect from a first and second dimension. On the other hand, as soon as we introduce the concept of a fourth coordinate differing essentially from the other three, this coordinate ceases to be a geometrical conception, and may be taken to represent time, density, or anything else we like.

Some American who had some money to get rid of and had no better use for it offered, in the *Scientific American*, a prize of 25l. for the best popular explanation of *the fourth dimension*, and the present volume is a collection of selected essays that were submitted in the competition, with an introduction by Dr. Henry P. Manning. It must be admitted that what the authors have written is mostly sensible and reasonable enough, and in no way contradicts the remarks that have been made above. If the book had been brought out under the title "Hyperspace Simply Explained," and the titles of those essays where the words occur had been altered by the substitution of "four" for "the fourth," the utility of the book would have been considerably increased. It contains very little that can be described as *unscientific*.

Diagram showing the Classification of the Elements: Periodic Arrangement. Size 44×68 inches. (London: Baird and Tatlock, Ltd.) Price, mounted on cloth, rollers, and varnished, 25s.

THE "periodic" classification of the elements plays such an important part in courses of inorganic chemistry for students that a large wall diagram illustrating this classification has now become a prominent feature in the equipment of the chemical lecture theatres of colleges and technical institutions. Such diagrams have usually had to be prepared by the staff of the department concerned. Many teachers of chemistry will therefore welcome the issue of a large printed chart, suitably mounted on stout linen, giving the usual periodic classification of the elements with their names and atomic weights. The lettering is bold and clear, although, perhaps, a little wider spacing might have been allowed with advantage.

The chart fails to show, however, the differentiation of each vertical group into "odd" and "even" series. From a teaching point of view there is much to be said for placing the helium and argon group of elements before the alkali group and not after the halogens. The method of classification used for the iron-platinum group is perhaps not quite the most satisfactory one, though this is, of course, at present largely a matter of individual opinion. The chart as a whole would probably gain in clearness by replacing in future issues the names of the elements by their customary symbols.

Apart from the relatively minor points just mentioned, the chart will probably prove of considerable service to lecturers of chemistry by relieving them of the necessity of preparing the large diagram illustrating the periodic classification which is now essential for class teaching of chemistry.

Leitfaden der Biologie für die Oberklassen höherer Lehranstalten. By Dr. O. Rabes and Prof. E. Löwenhardt. Pp. x+248. (Leipzig: Quelle and Meyer, 1910.) Price 3 marks.

THIS book is intended for the use of pupils who have already had a certain amount of biological training in school. It covers a very great deal of ground in a very superficial manner, but in the hands of a capable teacher it should serve as a good foundation for an extremely interesting course of general biology. It commences, in what we conceive to be a very logical manner, with a general account of the cell, but the fact that this occupies less than one page is typical of the superficial method of treatment. A few unicellular organisms are then dealt with, chiefly from the physiological point of view.

The general physiology of multicellular organisms comes next, and the first part concludes with a description of seventeen types of plants and animals, ranging from bacteria to the bean in the vegetable series, and from *Paramoecium* to the rabbit amongst animals. The descriptions and illustrations of these seventeen types occupy twenty-six pages! The type system has become almost vestigial.

The second part of the book is devoted to the dependence of organisms upon their environment (œcology), including geographical distribution and an appendix on the geological history of plants and animals and the theory of descent. The third part deals with man, mainly from the physiological, ethnological, and palæontological points of view.

The book is very copiously and admirably illustrated, but four or five volumes of its size would be required to do justice to the subject-matter.

Tarr and McMurry's Geographies. The Five Book Series. First part, Home Geography. Pp. xi+112. Price 2s. 6d. Second part, The Earth as a Whole. Pp. ix+168. Price 2s. 6d. Third part, North America. Pp. xix+469. Price 4s. 6d. Fourth part, General Geography, South America and Europe. Pp. xvii+378. Price 3s. Fifth part, Asia and Africa. Pp. ix+214. Price 2s. 6d. By Prof. Ralph S. Tarr and Prof. Frank M. McMurry. (New York: The Macmillan Co., 1908, 1909, 1910.)

THE authors, who are well-known writers on geographical subjects from the point of view of the school, have evidently taken great pains to adapt themselves to the needs and capabilities of young pupils. On the whole, they have been successful in producing a good, workable course of school geography. Written primarily for American boys and girls, great prominence is given to the geography of the United States and less importance to that of the British Isles. When it is pointed out, however, that while 230 pages are devoted to the United States, the British Isles are disposed of in 35 pages, it will be seen that the volumes are hardly suitable for adoption as class-books in our schools. But they should prove of great assistance to our teachers in showing how geography may be taught in a way to arouse interest and develop thought. Every part is well and profusely illustrated with views, diagrams, and photo-relief maps. In addition there are numerous coloured political maps, but no use appears to be made of coloured orographical maps.

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LETTERS TO THE EDITOR.

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Koch's Discovery of the Method of Plate-culture of Micro-organisms.

READING the interesting notice of Robert Koch which appeared in NATURE of June 2, I was reminded of an incident mentioned concerning his early scientific career in the preface to Cohnheim's "Gesammelte Abhandlungen." Cohnheim, the pioneer of what has been sometimes termed physiological pathology, died in 1884 at the early age of forty-five. The preface to his collected works, published in the following year, contains a charmingly written memoir of him from the pen of his friend W. Kühne, the accomplished Heidelberg physiologist. The obituary notice of Koch in NATURE rightly stressed the immense value to bacteriology of his invention of the plate-method for obtaining pure cultures of micro-organisms. The incident reported by Kühne in his memoir of Cohnheim has reference to that, and to Cohnheim's contact with Koch in consequence of it in the year 1875. At that time Cohnheim was already full professor of pathology in the University of Breslau, and his brilliance as an investigator was already attracting to his laboratory men of promise from all parts. Koch, on the other hand, was in country practice in Silesia, and quite unknown to the scientific world. Koch's discovery of the plate-method led to Cohnheim's discovery of Koch, and the enthusiasm and remarkable prevision at once shown by the young professor of pathology regarding his unknown compeer, only two years younger than himself, are strikingly told by Kühne. His words run:—

"In November, 1875, Robert Koch wrote begging Cohn, the celebrated botanist, Professor of Botany in the University, to look at cultures of anthrax bacilli which he (Koch) had prepared pure; and for that purpose Koch went to Breslau to see him. Cohn had had many tiresome and disappointing experiences of cultures of pathogenic organisms brought to him with the assertion that they were of pure and isolated species; in the present instance he naturally felt at first little confidence, but after interviewing Koch he sent a messenger to the Pathological Institute asking someone to come over because a visitor, Dr. Koch, had something to show which was 'quite right and very interesting.' In the Pathological Institute, Weigert, Cohnheim's assistant, was about to perform an autopsy; Cohnheim himself therefore went across to the Botanical Laboratory, and when he returned he said, 'Now leave off everything here and go over to Koch. The man has made a tremendous discovery, which for its simplicity and its accuracy of method deserves admiration all the more because Koch himself is living entirely remote from scientific intercourse, and has done it all by himself and finished it right out. There is nothing whatever to add to it. I regard it as the greatest discovery in the whole field of bacteriology, and I believe Koch will surprise us all in times to come with further discoveries and put us all to the blush for our laurels.'"

Perhaps this picturesque reference to a turning point in Koch's earlier career, being contained in a volume little likely to be sought for information about him, might escape the notice of some whom it would interest, especially at the present time.

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Crocodiles and Sleeping Sickness.

IN the obituary notice of Prof. Robert Koch in NATURE of June 2 (p. 404), it is stated that "Koch suggested that the crocodile might be the reservoir host of the trypanosome that gives rise . . . to sleeping sickness." This is a statement that has been made very often, especially in the daily Press, but which I, for my part, have never been able to verify, although I have some acquaintance with Koch's writings on the subject of sleeping sickness. Since this idea has been attributed so often to Koch, it is doubt-